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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,297	09/24/2003	Sanjay Verma	3222-4	8487

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EXAMINER	
VAUTROT, DENNIS L	

ART UNIT	PAPER NUMBER
2167	

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/671,297	VERMA ET AL.	
	Examiner	Art Unit	
	Dennis L. Vautrot	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/15/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-14 are rejected under 35 U.S.C. 102(b) as being anticipated by **Lomet et al.** (US 5,485,607).

3. Regarding claim 1, **Lomet et al.** teaches a database management system, comprising: a processor configured to provide a neighborhood locking scheme for a neighborhood associated with a data item, the neighborhood locking scheme providing a first locking mode for the data item while creating a second locking mode for the neighborhood associated with the data item. (See column 9, lines 15-21 "As FIG 6. shows, the deleting transaction requests a lock not only on the targeted key value/range but also on the "next" key value/range, i.e., on key value/range k_{i+1} which includes the range previously represented by the deleted key value k_i. Since that range has now been modified, no access to it should be permitted. The lock acquired on k_{i+1} is therefore an X-mode lock"; and column 13, 46-49 "The transaction will request an instant IIn lock on the range from k_i to k_{i+1} to determine whether that range has a conflicting lock, which, as FIG. 7 indicates, can be an ID, S, or SIX lock.") Here, the two

locking modes from the claim are shown by the neighborhood ("key value/range") lock as well as the "next" key value/range lock.

4. Regarding claim 2, **Lomet et al.** teaches a database management system according to claim 1 wherein the neighborhood locking scheme allows a non-serializable scan of the data item with a first transaction while allowing a non-serializable lock on the neighborhood with a second transaction. (See column 9, lines 29-33 "Clearly, if that range had been, say, scanned by another uncommitted transaction, as indicated by an S, X, or SIX lock, that range should not be modified by inserting a new record into it. Testing by means of an IX-mode prevents this.") This is showing that the scan is being allowed on the data item, while the lock (an IX-mode lock in this case) is on the neighborhood).

5. Regarding claim 3, **Lomet et al.** teaches a database management system according to claim 1 wherein the neighborhood locking scheme allows a first non-serializable lock on the data item with a first transaction while concurrently allowing a second non-serializable lock on the neighborhood with a second transaction. (See column 9, lines 42-45 "The inserting transaction requests only an instant lock on k_{i+1} because there is no reason why one transaction's insertion of k_i' should prevent another transaction's access to k_{i+1}.") K_{i+1} is referring to the data item of the claim. Examiner interprets this to mean that a separate lock is possible on both the neighborhood and

the data item, although in this case, there is no lock preventing access to the neighborhood where k_i would be inserted.

6. Regarding claim 4, **Lomet et al.** teaches a database management system according to claim 1 wherein the neighborhood corresponds to free space between tuples in a table. (See column 8, lines 38-43 "This system dynamically re-defines key-value ranges in accordance with the current population of key values. Specifically, the system maintains a key-value-ordered index, and the possible lockable ranges are the ranges between each pair of successive key values that currently exist in the index.") In other words the ranges between the key values are synonymous with neighborhoods.

7. Regarding claim 5, **Lomet et al.** teaches a database management system according to claim 4 wherein the tuples in the table are identified through an index. (See column 8, lines 40-43 "Specifically, the system maintains a key-value-ordered index, and the possible lockable ranges are the ranges between each pair of successive key values that currently exist in the index.")

8. Regarding claim 6, **Lomet et al.** teaches a database management system according to claim 1 wherein the neighborhood locking scheme includes a neighborhood lock (Xnei) mode that enables a first transaction to lock the neighborhood for inserting a new tuple B but prevents the first transaction from locking a tuple associated with the neighborhood. (See column 9, lines 42-45 "The inserting transaction

requests only an instant lock on k_{i+1} because there is no reason why one transaction's insertion of k_i' should prevent another transaction's access to k_{i+1}.") K_{i+1} is the tuple associated with the neighborhood, and as said in the reference, there is no reason for having to preventing access to it.

9. Regarding claim 7, **Lomet et al.** teaches a database management system according to claim 6 wherein the Xnei mode enables a second concurrent transaction to modify the tuple while preventing the second concurrent transaction from having exclusive rights on the neighborhood. (See column 9, lines 33-39 "However, there is no reason why the k_i' record cannot be inserted by one transaction just because another uncommitted transaction has previously inserted the k_{i+1} record, as indicated by a previously existing IX-mode lock. Since the requested IX-mode lock is compatible with an IX-mode lock, such an insert in front of another insert can occur.") K_{i+1} is referring to the tuple here. In other words, exclusive rights are not needed on the neighborhood to simply modify the tuple.

10. Regarding claim 8, **Lomet et al.** teaches a database management system according to claim 1 wherein the neighborhood locking scheme includes a non-serializable end of scan (Snei) lock mode that allows a first transaction to only read the neighborhood while preventing the first transaction from reading or writing a tuple associated with the neighborhood. (See column 5, lines 22-25 "For example, a lock acquired by a transaction as a result of an operation that only reads records does not

need to prevent other transactions from reading those same records, but a lock resulting from a write operation does.")

11. Regarding claim 9, **Lomet et al.** teaches a database management system according to claim 8 wherein the Snei lock mode 5 enables a second concurrent transaction to read and write the tuple and modify the data neighborhood. (See column 6, lines 14-17 "It shows that, upon a scan-type read operation, i.e. one which requests all records within a given range, a lock of the S type is acquired on the range or ranges involved but not on the individual key values.")

12. Regarding claim 10, **Lomet et al.** teaches a method for controlling access to data items in a database, comprising: identifying a neighborhood associated with a data item in the database (See column 8, lines 38-46 "This system dynamically re-defines key value ranges in accordance with the current population of key values. Specifically, the system maintains a key-value ordered index, and the possible lockable ranges are the ranges between each pair of successive key values that currently exist in the index. That is, if the existing key values are k1, k2,..., ki,... such that ki<ki+1, then the ranges are the disjoint semi-open intervals (Ki, Ki+1], and each such range is identified by the upper bounding key value."); providing a first set of access privileges for the data item; and providing a second set of access privileges for the neighborhood associated with the data item (See column 8, lines 59-61 and 63-67 "...an ARIES/KVL operation does not separately lock key values and key ranges." "FIG. 6 does include a second column

for insert and delete operations, but this does not indicate that key values and ranges are locked separately for these operations. Instead, it represents a separate lock on what will be described below as the "next" key value/range.")

13. Regarding claim 11, **Lomet et al.** teaches allowing a first transaction to modify the neighborhood while concurrently allowing a second transaction to modify the data item. (See column 10, line 17-22 "But the range-definition approach used in ARIES/KVL, which we will call "key-value locking" ("KVL"), can be implemented in a system that, like the other MGL approach described above, locks key values and ranges separately. Such a system would yield greater concurrency.")

14. Regarding claim 12, **Lomet et al.** teaches preventing the first transaction from locking the data item. (See column 6, lines 16-17 "...a lock of the S type is acquired on the range or ranges involved, but not the individual key values.") The neighborhood is what the reference refers to as the "range".

15. Regarding claim 13, **Lomet et al.** teaches gaining access for modifying the neighborhood by asserting a neighborhood lock (Xnei) on the data item. (See column 9, lines 42-45 "The inserting transaction requests only an instant lock on k_{i+1} because there is no reason why one transaction's insertion of k_i' should prevent another transaction's access to k_{i+1}.") K_{i+1} is referring to the data item of the claim. Examiner interprets this to mean that a separate lock is possible on both the neighborhood and

the data item, although in this case, there is no lock preventing access to the neighborhood where k_i would be inserted.

16. Regarding claim 14, **Lomet et al.** teaches using entries in an index to identify the neighborhood. (See column 8, lines 40-43 "Specifically, the system maintains a key-value-ordered index, and the possible lockable ranges are the ranges between each pair of successive key values that currently exist in the index.") In other words the ranges between the key values are synonymous with neighborhoods.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

"ARIES/KVL: A Key-Value Locking Method for Concurrency Control of Multiaction Transactions Operating on B-Tree Indexes", by C. Mohan, Data Base Technology Institute, IBM Almaden Research Center, San Jose, CA 95120, USA. Proceedings of the 16th VLDB Conference Brisbane, Australia, August 1990.

Choi et al., US Patent Application Publication 2004/0267747. Teaches an Index lock scheme.

Porter, US Patent Application Publication 2004/0139116. Teaches attribute level locking.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis L. Vautrot whose telephone number is 571-272-2184. The examiner can normally be reached on Monday-Friday 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on 571-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dv
March 27, 2006

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